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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/631,900	08/01/2003	Wilfried Clauss	007413-060	9807

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EXAMINER	
JOHNSTON, PHILLIP A	
ART UNIT	PAPER NUMBER
2881	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/631,900	Applicant(s) CLAUSS, WILFRIED	
	Examiner Phillip A Johnston	**Art Unit** 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Detailed Action

1. This Office Action is submitted in response to Amendment dated 7-07-2004, wherein claims 2 and 3 are cancelled and new claims 22-31 have been added. Claims 1, and 4-31 are pending.

Detailed Action

Claims Rejection – 35 U.S.C. 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, and 4-21 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Pub. No. 2002/0084422 to Kienzle, in view of Kamijo, U.S. Patent No. 6,566,663.

Kienzle (422) discloses deflector for charged particles having a magnetic lens assembly that utilizes a ferrite ring stack with a set of current carrying windings around

the ferrite rings, as recited in Claims 1,14 and 18-21. See Abstract, Paragraph's [0002], [0052], [0063] and [0064].

Kienzle (422) as applied above fails to teach that the permeability number is temperature dependent according to the following relationship;

$$\mu_{max}\text{-}\mu_{min}/\ \mu_{max} \cdot \Delta T = c, \text{ with } c < 3.10\text{-}3 \text{ K-1}$$

where;

μ_{max} is a maximum value of the permeability number in the temperature range,

μ_{min} is a minimum value of the permeability number in the temperature range,

and ΔT is a width of the temperature range.

However, Kamijo (663) discloses in FIG. 2 a plot of the relationship of the initial permeability μ_i of ferrite to temperature. The plot exhibits two peaks, of which the higher (right-hand) peak is called the "primary" peak and the lower (left-hand) peak is called the "secondary" peak. The apex (the extremum of Claims 9,10,15, and 16) of the primary peak is at a temperature just below the Curie point (T_c) of the ferrite. With ferrites, the Curie point is strongly dependent upon the specific composition and fabrication parameters of the specific ferrite material, but generally is approximately 200°C. i.e., the Curie point (and the position on the abscissa of the apex of the primary peak) can be changed by making changes in, for example, the composition of the ferrite material or the temperature at which the ferrite is fired. Also, the position on the abscissa of the apex of the secondary peak can be adjusted by making changes in the composition and/or fabrication parameters of the ferrite. By making these changes in one or both the primary and secondary peaks, the shape and location of the valley

between the primary and secondary peaks can be changed as desired. See Column 8, line 12-34.

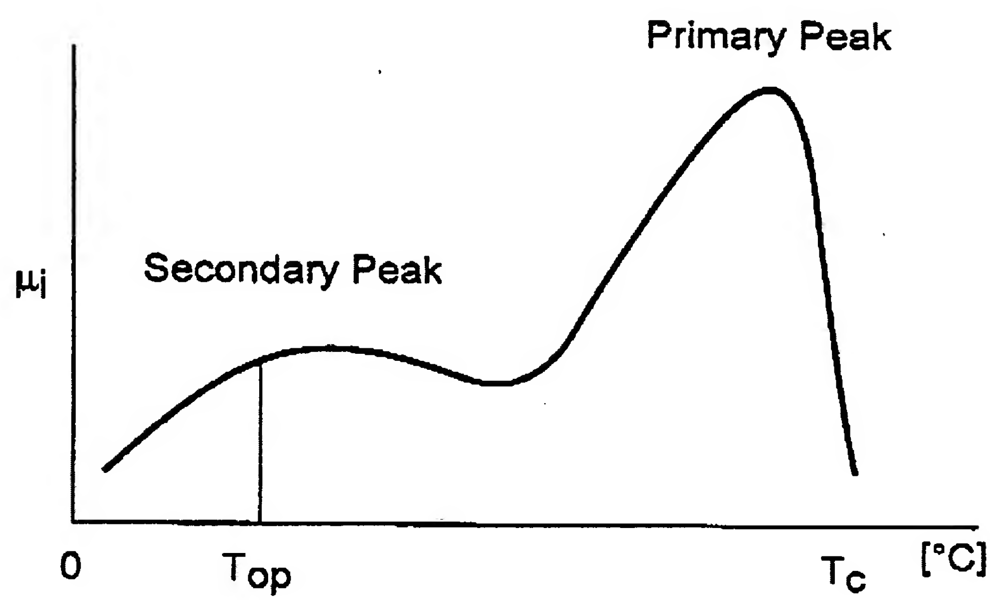

FIG. 2

Kamijo (663) further points out that the change in the slope of the curve of initial permeability μ_i accompanying a change in temperature at the normal operating temperature T_{op} can be set at will. See Column 8, line 51-65.

Kamijo (663) still further indicates that the normal operating temperature T_{op} of the ferrite desirably is lower than the temperature coordinate of the valley between the primary and secondary peaks of initial permeability μ_i. See Column 9, line 54-60.

Kamijo (663) also describes the use of ferrite B having an initial permeability of 7000, where the rate of change of the initial permeability exhibited by ferrite B was 11

per unit (°C.) That is, $\Delta\mu$ (rate of change of permeability) for ferrite B was $1.6 \cdot 10^{-3}$ in the valley between the primary and secondary peaks. See Column 13, line 44-49.

Kamijo (663) discloses nearly all the limitations of Claims 1-8 and 14 but the values of c are different from "$c < 3 \cdot 10^{-3} K^{-1}$" as recited in Claims 1 and 14, and different from "$c < 9 \cdot 10^{-4} K^{-1}$ to $c < 1 \cdot 10^{-6} K^{-1}$" as recited in Claims 2-8. However, Kamijo (663) above indicates that the value "c" is a results effective variable used to design a ferrite material having a permeability vs. Temperature curve that will suppress the effects of temperature fluctuations on the value of permeability whenever the magnetic field intensity is high.

Kamijo (663) is evidence that ordinary workers in the art of magnetic deflectors for charged particles would find the reason, suggestion, or motivation to make changes in the composition and/or fabrication parameters of the ferrite to change the shape of the Permeability vs. Temperature curve to obtain a desired temperature response.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to change the composition and/or fabrication parameters of the ferrite to produce a permeability vs. temperature curve having a small rate of change between the primary and secondary peaks in accordance with Kamijo (663) to obtain a temperature dependent permeability number that results in a rate of change "c" that is less than $3.10^{-3} K^{-1}$, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore it would have been obvious to one of ordinary skill in the art that the magnetic lens assembly of Kienzle (422) can be modified to use the ferrite material in accordance with Kamijo (663), to provide a ferrite having increased temperature stability, so that the AC magnetic field intensity created by the deflector experiences no change with temperature.

Regarding Claims 11-13, Kienzle (422) in view of Kamijo (663) discloses the claimed invention except for the use of permeability numbers higher than 8000 and 10000. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the high permeability numbers recited in Claims 11-13, since it has been held that where the general conditions of a claim are disclosed in he prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller 105 USPQ 233.

Regarding Claim 17, use of a temperature–adjusting unit, as recited in Claim 17 is considered Applicants admitted prior art. See Applicants specification page 2, line 1-5, which states; "According to US 6,188,071 B1, a temperature control is provided to stabilize the temperature of the ferrite body in order to reduce influences of temperature on the quality of the lithographic process."

4. New claims 22-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Pub. No. 2002/0084422 to Kienzle, in view of Kamijo, U.S. Patent No. 6,566,663.

The combination of Kienzle (422) and Kamijo (663), discloses all the limitations of new claims 22-31, for the reasons applied above to claims 1, and 4-21.

Examiners Response to Arguments

5. Applicant's arguments filed 7-07-2004 have been fully considered but they are not persuasive.

Arguments 1-4.

Applicant states that, "First, it is respectfully submitted that the rejection does not make out a prima facie case of obviousness at least because the Kamijo et al. patent does not indicate that the claimed parameter "c" is a result-effective variable. As noted at MPEP 2144.05(II)(B) a particular parameter must be recognized in the prior art as a result effective variable before determination of optimum or workable ranges can be viewed as routine experimentation. In re Antonie, 195 USPQ 6 (CCPA 1977). Contrary to the Office's suggestion, it is not seen where the Kamijo et al. patent allegedly discloses an appreciation for the claimed parameter "c" as a result effective variable. The Kamijo et al. patent discloses adjusting the slope of the initial permeability curve at column 8, lines 51-55, for example, but does not disclose further dividing the slope by the maximum permeability (or by any permeability value) in an operating temperature range to obtain a parameter that is a result effective variable. Accordingly, the rejection is deficient for at least this reason and should be withdrawn."

Applicant also states that, "In addition, it is respectfully submitted that the Kamijo et al. patent teaches away from the subject matter recited in independent claims 1 and 14. With this understanding in mind, it is evident that the Kamijo et al. patent teaches away from the subject matter recited in claims 1 and 4-21. These claims include

limitations on the variable "c" (which is proportional to the slope of the permeability number in a temperature range that includes the operating temperature) wherein the recited values of "c" are substantially smaller than can be inferred from the example cited by the Office at column 13 of the Kamijo et al. patent. In this regard, claims 1 and 14 have been amended to incorporate the subject matter of l im 4 to recite that "c" is less than $3 \cdot 10^{-4} K^{-1}$ to further highlight this distinction. To the extent that one can determine a value of "c" from the example disclosed at column 13 of the Kamijo et al. patent, it would appear to be about $1.6 \cdot 10^{-3} K^{-1}$(i.e., 11 divided by 7000), a value more than five times larger than that recited in independent claims 1 and 14. Dependent claims 4-8 are further distinguishable in this regard. It is respectfully submitted that routine optimization of the parameters disclosed in the Kamijo et al. patent by one of ordinary skill in the art would not have lead to the subject matter recited in claims 1 and 4-21 because such optimization would have been carried out consistent with the overall disclosure of the Kamijo et al. patent, which is to operate in a regime that provides for intersecting B-H curves. Thus, operating according to the Kamijo et al. patent necessarily requires operating in a temperature range in which the permeability has a sufficiently large slope as discussed above, and which excludes "c" values as recited in claims 1 and 14 as well as in claims 4-8."

Applicant further states that, "Also, unlike the Kamijo et al. subject matter, the claimed subject matter includes a case (claims 9, 15) wherein a temperature dependency of the permeability number has an extremum in the operating temperature range and a case (claims 10, 16) wherein the operating temperature is

substantially a temperature at which the temperature dependency of the permeability number is an extremum (i.e., the slope of the permeability curve at the operating temperature is substantially zero). The Office Action at page 3 appears to suggest that one of ordinary skill would have been motivated to choose an operating temperature at the apex of the primary peak of the μ(T) curve shown in Figure 2 of the Kamijo et al. patent, the apex occurring at a temperature of approximately 200 C. It is respectfully submitted that the Kamijo patent teaches away from choosing such an operating temperature. In particular, in addition to the reasons set forth above, the Kamijo et al. patent discloses that the operating temperature is preferably lower than the temperature at the valley between the primary and secondary peaks of the curve shown in Figure 2 (column 9, lines 54-60). The Kamijo et al. patent further discloses using an operating temperature of 25 C (column 13, 35-39) and indicates that the temperature range is about ± 0.01 C from the normal operating temperature even in extreme cases (column 13, lines12-15). Accordingly, one of ordinary skill in the art would not have been motivated to use an operating temperature range at the apex of the primary peak of Figure 2 of the Kamijo et al. patent as suggested by the Office because the Kamijo et al. patent expressly teaches away from doing so, and claims 9, 10, 15 and 16 are further patentable for these additional reasons."

The Applicant still further states that, "With regard to claims 12-13, the Office suggests that permeability numbers greater than 8000 and 10000 would have been obvious as a result of discovering optimum or working ranges, citing In re Aller, 105 U.S.P.Q. 233. In this regard, MPEP § 2144 indicates that legal precedent can be relied

upon as a rationale in support of obviousness only if the facts of the case under examination and the facts of the legal decision are sufficiently similar. The rejection does not contain any analysis or comparison of the facts of the present application with those in Aller. Actually, the facts of the present case are easily distinguishable from those of Aller. In particular, in Aller the patent was directed to a process for the production of phenol (carboxylic acid).The claimed process was identical to the prior art except that the claims recited lower temperatures and higher sulphuric acid concentrations than shown in the applied reference. 105 U.S.P.Q. 233, 234. In contrast, the present presently claimed subject matter reflects an approach that is substantially different than that of the Kamijo et al. patent for reasons discussed above."

The applicant is respectfully directed to applicants specification, as published in Patent Pub. No. US 20040061067, paragraphs [0006], [0009], [0041], and [0050], and amended claim 1, which state respectively;

[0006] For example, a beam deflector is known from U.S. Pat. No. 6,188,071 B1 for use in a lithography system. Here, a beam traversing the apparatus is an electron beam which is used as writing beam of the lithography system. A resolution of the lithography method performed therewith is thus determined also by the accuracy with which the deflection or/and focusing of the writing beam is performed in the apparatus. The apparatus comprises ferrite bodies for carrying the magnetic fields produced by current conductor windings. It is a property of ferrite materials that their magnetic permeability is temperature-dependent. Accordingly, if the temperature of the ferrite

body changes, its magnetic property will also change and, correspondingly, the effects, which the apparatus exerts on the writing beam traversing the same will change with temperature variations.

[0009] The invention takes into account the fact that the permeability number of the magnetic-flux-carrying body always depends on temperature. In order to reduce influences exerted by temperature changes in the magnetic-flux-carrying body on the manipulation of the beam, the temperature-adjusting unit is accordingly provided for stabilizing the magnetic-flux-carrying body substantially to the nominal or target temperature.

[0041] The beam conductors 47 are energized such that the magnetic flux in the ferrite rings 45 is well below a saturation value, such that changes in the magnetic field have a substantially linear dependency from variations of an energizing current. For example, a maximum flux induced in the ferrite rings 45 may be below 25% of a saturation flux therein, or in particular below 15% or even below 10%. Further, the energizing current may be an AC current such that an orientation of the magnetic flux carried by the ferrite rings changes from time to time or periodically.

[0050] On the other hand, if a operating temperature of a particle-optical apparatus is predetermined, a ferrite material can be suitably selected. The temperature dependence of a ferrite material is dependent upon a composition thereof. Therefore, it is preferred to use or design a ferrite material, which exhibits only slight permeability variations in a temperature range about the operating temperature.

Amended claim 1. A method of manipulating charged particles of a beam of charged particles by a magnetic field, the method comprising: providing a magnetic field generating apparatus having a magnetic-flux-carrying body made of a material with a high permeability number, and at least one current conductor engaging at least partially around the magnetic-flux-carrying body, and operating the magnetic-flux-carrying body at a operating temperature, wherein the permeability number of the material is temperature dependent, and the material and the operating temperature are chosen such that the operating temperature is within a temperature range, in which the following applies:

μ_{max}-μ_{min}/ μ_{max} · ΔT = c, with c < 3.10-4 K-1

where;

μ_{max} is a maximum value of the permeability number in the temperature range,

μ_{min} is a minimum value of the permeability number in the temperature range,

and ΔT is a width of the temperature range.

The applicant is respectfully directed to Kamijo (663), (a) Column 5, line 23-42; (b) Column 7, line 38-47; also (c) Column 7, line 63-67; and Column 8, line 1-10 which state respectively;

(a) In another embodiment, the unit of ferrite exhibits a saturation magnetic flux density that decreases with an increase in ferrite temperature relative to a normal operating temperature of the ferrite, and a maximum permeability that increases with an increase in ferrite temperature relative to the normal operating temperature of the ferrite.

(b) Let the magnetic field intensity applied to the ferrite by the respective deflector be equal to H_{AC}. The permeability of the ferrite is calculated by dividing a permeability, corresponding to the magnetic flux density B and the maximum magnetic field intensity H whenever an AC magnetic field (having a time-average magnitude of zero) is applied to demagnetized ferrite, by the vacuum permeability $m\mu_0$. This calculation is equivalent to dividing the slope of a straight line, from the point P (on the initial magnetization curve at H_{AC}) to the origin, by the vacuum permeability $m\mu_0$.

(c) The particular ferrite used in the ferrite stack desirably is selected so that the magnetic field intensity created by the respective deflector at the ferrite stack is equal to H_{AC}. Under such conditions, the permeability of the ferrite experiences no significant change whenever the ferrite is at its normal operating temperature or the temperature of the ferrite experiences a change (e.g., temperature rise) from its normal operating temperature. (Within a temperature range in which the initial magnetization curves for each temperature intersect at the point P, the permeability does not change. The range of temperature depends upon material properties and the design specifications.) In other words, even if the temperature of the ferrite changes, no change in magnetic flux density B as created by the deflector occurs on the optical axis, resulting in no adverse effect on the charged particle beam.

The examiner has interpreted from the applicants specification and Kamijo (663) references above that, (1) The variable c in claim 1, defines the temperature dependence of a ferrite materials permeability relative to a maximum permeability (μ_{max}); (2) Both the applicant and Kamijo (663) define the operating temperature of

their respective deflectors, by selecting a ferrite material whose permeability exhibits substantially no change in the temperature range of interest; (3) Both also select a material for the deflectors ferrite body wherein the permeability will stabilize magnetic flux density relative to μ_{max}; (4) Both determine the operating temperature of the ferrite body by dividing the slope of the permeability curve by a permeability value; (5) Both recognize that the temperature dependence of a ferrites permeability curve relative to a reference permeability value is a results effective variable, which can be used for defining the operating temperature point of a ferrite body within a temperature range.

Conclusion

6. The Amendment filed on 7-07-2004 under 37 CFR 1.131 has been considered but is ineffective to overcome the Kamijo (663) and Kienzle (422) references.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (571) 272-2477. The fax phone number for the organization where the application or proceeding is assigned is 703 872 9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ
September 17, 2004

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
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